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CICHLASOMA REGANI, A NEW SPECIES OF CICHLID FISH FROM THE RIO COATZACOALCOS BASIN, MEXICO

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In 1957 and 1959, collections were made in the upper part of the Río Coatzacoalcos basin near the crest of the Isthmus of Tehuantepec, Oaxaca, México. One paper on cichlid fishes collected there (Miller and Nelson, 1961) gave the specific traits of a seemingly localized endemic of the *Thorichthys* group, *Cichlasoma callolepis* (Regan). The present paper describes another localized endemic, this time of the *Theraps* group, which I am pleased to name for the late British ichthyologist, C. Tate Regan, in recognition of his classic studies on American cichlids.

Study materials are in the collections of the Museum of Zoology of The University of Michigan (UMMZ), the National Museum of Natural History (USNM), and the Museum of Natural History of The University of Kansas (KU). The lateral-series scale count begins with the first scale in the upper lateral line, goes to the last one in that line, then continues with the scale on the lower lateral line that is next behind the transverse row that extends downward and forward from the last pored scale of the upper lateral line. The last scale recorded is at the end of the lower lateral line, where it meets the base of the caudal fin (this is not necessarily the last pored scale, since pored scales often extend onto the caudal fin). This method is equivalent to Regan's "longitudinal series," as redefined by Trewavas (1935: 72), and is employed to

make use of his extensive scale-count data on American cichlids (Regan, 1905a–c, 1906a–b). The transverse-series scales are counted, as described by Regan, from the base of the first dorsal spine downward and backward to, but not including, the scale row on the midline of the abdomen. Fin-ray counts and measurements are made according to the methods prescribed by Hubbs and Lagler (1958).

Cichlasoma regani, new species

Figure 1

Cichlasoma sp. Miller (1966: 793), upper part of Río Coatzacoalcos basin, Atlantic slope of Isthmus of Tehuantepec, México.

Diagnosis: A moderately small, rather slender-bodied, large-scaled species of the *Theraps* group of Regan (1906–08: 17), distinguished from other members of this group by lacking both clearcut vertical bars and a horizontal stripe on the side of the adult, with 32 (31–33) scales in lateral series, typically XVII,13 elements in dorsal and VI,9 in anal fins, 3 + 8 or 9 gill rakers, rather somber life colors, and the adult with 2 or 3 blotches along upper side below dorsal fin and a prominent dark spot at caudal base.

Holotype: UMMZ 184756 (adult female, 80.5 mm S. L.), from Río Almoloya where crossed by the Trans-Isthmian Highway about 33 km north of southern terminus of that road, at 95° 01′ W Long., 16° 45′ N Lat., Oaxaca, México, taken 25 February 1959 by R. R. Miller and R. J. Schultz; elevation approximately 250 meters.

Paratypes: UMMZ 184757 (11, 36–67 mm), same data as holotype. UMMZ 178529 (male, 37 mm), same locality as holotype, 27 March 1957, R. R. and M. Miller. USNM 102255 (male, 95 mm), from Río Malotengo, upper tributary Río Coatzacoalcos, 6.4 km southeast of Matías Romero, Oaxaca, 21 December 1935, T. MacDougall. KU 1573-1574 (2 females, 116 and 145 mm), from 60 km southwest of Jesús Carranza (Río Jaltepec drainage), Oaxaca, 26–30 March 1948, W. W. Dalquest; elevation, 150 meters.

Description: Form and color pattern are shown in Figure 1 and meristic data are given below. Proportional measurements appear in Table 1.

Dorsal spines, XVI (1), XVII (15); dorsal soft rays, 12 (1), 13 (12), 14 (3); anal spines, V (1), VI (15); anal soft rays, 9 (16); pectoral rays in both fins (splint along uppermost ray excluded), 15 (11), 16 (21). Lateral scales, 31 (2), 32 (13), 33 (1); scales in upper lateral line, 20 (1), 21 (5), 22 (6), 23 (4), and in lower lateral line, 9 (1), 10 (3), 11 (5), 12 (5), 13 (2); scale-row overlap of the upper lateral line on the lower, 2 (2), 3 (3), 4 (5), 5 (4), 6 (2); transverse scales, 18 (1), 19 (3), 20 (7), 21 (5); lateral line to soft dorsal origin

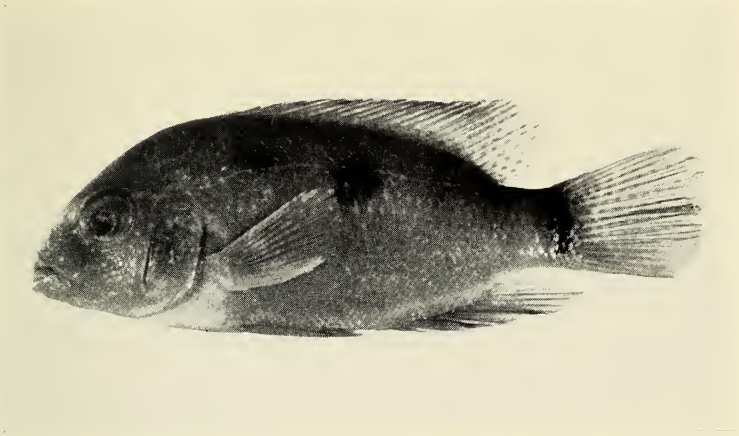

FIG. 1. *Cichlasoma regani*, holotype, UMMZ 184756, female, 80.5 mm standard length, from Río Almoloya, Oaxaca, México.

(not including scales on scaly sheath along fin base), 2½ (6), 3 (7), 3½ (3); lateral line to origin of anal fin, 8 (4), 9 (10), 10 (2); scale rows between bases of pectoral and pelvic fins, 5 (7), 6 (8), 7 (1); scales around caudal peduncle, 8 + 9 = 19 (8), 9 + 9 = 20 (6); scale rows on cheek, 4 (7), 5 (9). Gill rakers on first arch, upper limb, 3 (14), 4 (2); lower limb, 8 (6), 9 (10); total, 11 (5), 12 (10), 13 (1). Vertebrae, 13 (1), 14 (14), 15 (1) precaudal; 16 (3), 17 (12), 18 (1) caudal; and 30 (2), 31 (14) total.

Body slender, elongate, becoming deeper with age, predorsal contour strongly arched in marked contrast to the gently sloping (concave) preventral contour. Highest point along back at or near origin of dorsal fin. Base of dorsal fin increasing in length with age. Mouth horizontal, low (well below level of ventral rim of orbit), lower lip thicker than upper (from about half to slightly greater than half diameter of pupil). Upper jaw extends to vertical from a point between nostril and anterior rim of orbit; jaws equal anteriorly or lower slightly included. Fold of lower lip not continuous, but frenum narrow. Dorsal origin above insertion of pectoral fin, spines increasing in length rapidly to about fifth to eighth, then more gradually to last (longest) which varies from slightly less than half (in juveniles) to half (in adults) head length; soft part of fin when laid back extending from anterior fourth to half of caudal fin. Pectoral shorter than head, extending from middle of to well beyond midlateral spot or to between anus and anal-fin origin; pelvic extending from anus to slightly beyond base of second anal spine. Caudal fin rounded to slightly emarginate. Caudal peduncle deeper than long. Depth of preorbital varying from about one-half

TABLE 1. Proportional measurements in per mille of standard length of the type-series of *Cichlasoma regani*. Juveniles are from UMMZ 178529 and 184757; adults include KU 1573–74, USNM 102255, the holotype, and 2 from UMMZ 184757; half-grown are from UMMZ 184757. Figures in parentheses are means.

Measurement	Juveniles (2)	Half-grown (4)	Adults (6)	Holotype
Standard length	35.9,37.1	44.4–53.1(48.0)	63.4–145.5(94.5)	80.5
Predorsal length	435,437	431–449(437)	419–435(427)	435
Body depth	404,410	410–421(414)	402–448(421)	404
Head length,	371,372	367–377(372)	337–356(348)	356
depth	342,345	328–358(347)	335–362(350)	353
Postorbital length	123,129	113–121(119)	107–128(115)	108
Snout length	123,127	135–145(141)	142–161(151)	154
Preorbital depth	56,62	65–72(68)	74–102(89)	89
Interorbital bony width	95,100	100–101(101)	101–117(110)	113
Orbit diameter	121,123	109–116(112)	80–111(95)	102
Cheek depth	100,105	105–110(108)	109–138(120)	122
Mandible length	140,148	132–146(141)	125–139(131)	127
Upper jaw length	95,102	99–105(102)	93–111(102)	104
Caudal peduncle length,	137,143	131–137(133)	134–149(142)	140
least depth	151,156	154–161(158)	148–154(152)	154
Dorsal-base length	555,568	576–585(581)	574–637(599)	574
Longest (= last) dorsal spine length	156,173	155–169(161)	166–204(181)	175
Anal-base length	270,275	266–275(270)	252–274(264)	252
Pectoral length	291,298	266–277(271)	273–303(282)	278
Pelvic length	279,286	241–275(260)	245–281(266)	251

diameter of orbit in juveniles to greater than orbit in large adults. Premaxillary process extending backward between a point on posterior part of snout to above middle of pupil. Along base of caudal rays one supplementary lateral line, lying either above or below principal lateral line, occurs in 6 juvenile-to-adults, and two supplementary lateral lines occur in 2 half-grown, holotype, and 2 largest specimens; the other types lack this feature.

Teeth: Jaw teeth conic, without a posterior cusp (present in *Herichthys*), bluntly pointed (sometimes peg-like). Teeth of outer series in upper jaw number 7 to 9 on each side, increasing rather regularly in size anteriorly; in lower jaw anterior 4 outer teeth enlarged, subequal, and sharply differentiated from smaller lateral ones. Occlusal surface of lower pharyngeal bone of a 67-mm specimen with dentigerous portion about 1.3 times broader than long, the teeth arranged in about 24 rows; those teeth in the two median rows, especially posteriorly, heavy and rounded (molariform) but most of them bear remnants of a central cusp, and those on rows on each side of these specialized (crushing) teeth also enlarged.

Color pattern: Up to seven vertical bars (mostly rather obscure) in young, four in juveniles, the broadest only about half diameter of eye, the third broadest and darkest dorsally extending from below dorsal fin nearly to venter or to anal fin, decreasing in number with age (4 in juveniles, 2–3 in small adults, 1–2 in large adults) and represented in larger specimens chiefly by prominent dark spots or blotches, 2 or 3 in number, along upper lateral line (Fig. 1), the largest blotch below 10th to 14th dorsal spines and above tip of extended pectoral fin; the upper lateral line runs through this blotch. Interradial membranes of soft dorsal and caudal fins with rows of prominent dark spots, weakly developed on soft anal fin. A prominent ovate to nearly round black spot occurs on base of caudal fin and adjacent part of caudal peduncle, extending over most of side of latter. Top of head with two prominent, dark brown, curved saddles, anterior one across snout to anterodorsal part of orbit and posterior one largely between eyes; anterior saddle widest at its midpoint, about two-thirds diameter of pupil, whereas posterior one narrowest there, about one-fourth to one-third diameter of pupil.

Color in life: At time of capture, no bright colors were noted on body or fins. Dorsal, caudal, and anal fins had rusty orange spots. Horizontal rows of spots along side following scale rows were black, each scale with a spot at or near its base, the rows becoming less prominent toward abdomen. Body greyish olive to greenish to golden yellow (on sides). Sexes not distinguished in field.

Habitat and Associates: The Río Almoloya is a clear winding stream of moderate gradient, about 6 meters wide on the average, with pools attaining a maximum depth of 3 meters. At the time of our visits late in the dry season it consisted of swift, rocky riffles alternating with long pools and some sluice-like sections. Nearly a fourth of the stream was

shaded with marginal vegetation along the steep banks. The bottom included much sand and silt in the pools, alternating with rocks and boulders on the riffles. There was also some bedrock. A green alga and localized growths of *Nasturtium* were the only aquatic plants noted. A fairly rich fish fauna was secured at this locality, including 18 species in 8 families: Characidae (*Astyanax fasciatus*), Pimelodontidae (*Rhamdia guatemalensis*), Belonidae (*Strongylura hubbsi* Collette, 1974), Poeciliidae (*Poecilia mexicana* and *P. sphenops*, *Heterandria bimaculata*, *Poeciliopsis fasciata* and *P. gracilis*), Atherinidae (*Archomenidia bolivari* and *Xenatherina schultzi*), Mugilidae (*Agonostomus monticola*), Cichlidae (*Cichlasoma aureum auct.*, *C. callolepis*, *C. bulleri*, *C. zonatum*, *C. salvini*), and Eleotridae (*Gobiomorus dormitor*).

Distribution: *Cichlasoma regani* is known from the Ríos Almoloya, Malotengo, and Jaltepec, upper tributaries of the Río Coatzacoalcos on the Atlantic slope of the Isthmus of Tehuantepec.

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